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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,620	07/31/2002	Sudipta Mukhopadhyay	RD-29161	8845

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GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
PATENT DOCKET RM. BLDG. K1-4A59
NISKAYUNA, NY 12309

EXAMINER	
HUNG, YUBIN	
ART UNIT	**PAPER NUMBER**
2624	

DATE MAILED: 06/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/064,620	MUKHOPADHYAY ET AL.	
	Examiner	Art Unit	
	Yubin Hung	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10-29 and 31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10-29 and 31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 July 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 8, 2006 has been entered.

Response to Amendment/Argument

2. Claims 9 and 30 have been cancelled; claims 1-8, 10-29 and 31 are still pending.

3. Applicant's cancellation claim 30 has rendered moot the objection to the specification.

4. Applicant's arguments with respect to all amended independent claims have been considered but are moot in view of the new ground(s) of rejection. See below

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-3, 10-14, 20, 21, 23-29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zanelli (US 6,515,657) and McGary (US 5,521,634).

7. Regarding claim 1, and similarly claims 12, 20, 24 and 31, Zanelli discloses

- selecting a portion of an image in a span of interest obtained from an acquired imaging sequence, wherein the selection comprises selecting both from a time sequence and a space sequence
  [Fig. 6; Col. 10, lines 21-52. Note that the catheter is the selected portion. Note further that per Col. 6, lines 9-11 and Col. 10, lines 25-27, the image is represented as I(x,y;z;t) with indicating the space sequence and t the temporal sequence]

Zanelli does not expressly disclose that the selected portion is losslessly compressed and decompressed.

However, McGary discloses losslessly compressing selected portions of an image sequence [Fig. 1, refs. 16-22; Col. 2, line 53-Col. 3, line 3; Col. 3, lines 23-35. Note that while decompression is not expressly disclosed, **Official Notice** is taken that it is well known and practiced by one of ordinary skill in the art to decompress compressed images in order to view or further process them.]

Zanelli and McGary are combinable because they are from the same field of endeavor of selecting image portion from an image sequence.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Zanelli with the teaching of McGary by applying lossless compression to the selected portion. The motivation would have been to reduce the storage requirement while preserving the ability to fully recover important portion (the selected portion) of the image sequence (as afforded by lossless compression).

Therefore, it would have been obvious to combine McGary with Zanelli to obtain the invention as specified in claim 1.

8. Regarding claims 2, 3, 10, and similarly claims 25, 26 and 28, Zanelli further discloses

(claims 2 & 26) wherein the portion of the image is a plurality of frames in a span of interest
[Fig. 6; Col. 10, lines 21-52]
(claims 3 & 25) wherein the portion is at least one frame in a span of interest
[Fig. 6; Col. 10, lines 21-52]
(claims 10 & 28) wherein selecting the portion of the image in the span of interest comprises selecting the portion of image in a time sequence
[Fig. 6; Col. 10, lines 21-52]

9. Regarding claim 11, and similarly claims 27 and 29, note that the ultrasonic image I(x,y;z;t) of Zanelli is also a space sequence.

10. Regarding claim 13, Zanelli further discloses

- wherein the imaging device is a medical imaging device selected from a magnetic resonance imaging system, a computed tomography system, an x ray system, an x ray angiogram system and an ultrasound system [Z: Fig. 6; Col. 10, lines 21-52]

11. Claim 14 is similarly analyzed and rejected per the analyses of claims 12 & 13 above.

12. Regarding claim 21, Official Notice is taken that ultrasonic images are usually fan-shaped (and therefore the selected image will be fan-shaped). [For example, see Koo et al. (US 5,846,203).]

13. Claim 23 is similarly analyzed and rejected as per the analysis of claim 1 and additionally the fact that lossy compression methods are well-known conventional compression methods. [For example, as admitted in paragraph 0002 of the application.]

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14. Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zanelli (US 6,515,657) and McGary (US 5,521,634) as applied to claims 1-3, 10-14, 20, 21, 23-29 and 31 above, and further in view of Scorse et al. (US 5,128,776).

15. Regarding claim 4, the combined invention of Zanelli and McGary discloses all limitations of its parent, claim 1.

Scorse discloses the following limitation that is not expressly disclosed in the combined invention of Zanelli and McGary:

- archiving the analytically relevant image sequence
  [Fig. 1, ref. 34, 38; Col. 4, lines 20-22]

The combined invention of Zanelli and McGary is combinable with Scorse since they have aspects that are from the same field of endeavor of compression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Zanelli and McGary with the teaching of Scorse by archiving relevant image sequence. The motivation would have been to have important data preserved for later use or review.

Therefore, it would have been obvious to combine Scorse with Zanelli and McGary to obtain the invention as specified in claim 4.

16. Regarding claim 7, Scorse further discloses

- wherein the user select option comprises manually marking frames of interest
  [Fig. 1, ref. 18; Col. 4, lines 35-37]

*****

17. Claims 5, 6, 8 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zanelli (US 6,515,657) and McGary (US 5,521,634) as applied to claims 1-3, 10-14, 20, 21, 23-29 and 31 above, and further in view of Ransford et al. (EP 479,563 A2).

18. Regarding claim 5, the combined invention of Zanelli and McGary discloses all limitations of its parent, claim 1.

Ransford discloses the following limitation that is not expressly disclosed in the combined invention of Zanelli and McGary:

- wherein selecting the portion in the span of interest comprises having a user select option for selecting the portion of image [Fig. 2, ref. 16; Col. 11, lines 8-28]

The combined invention of Zanelli and McGary is combinable with Ransford since they have aspects that are from the same field of endeavor of medical image processing (specifically, X-ray and ultrasound images).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Zanelli and McGary with the teaching of Ransford by having a user select the portion. The motivation would have been to improve the usability of the system by giving the user greater control.

Therefore, it would have been obvious to combine Ransford with Zanelli and McGary to obtain the invention as specified in claim 5.

19. Regarding claims 6 and 8, Ransford further discloses

(claim 6) wherein the user select option comprises segmenting an identifiable anatomy of a patient
[Col. 11, lines 28-32]
(claim 8) wherein the user select option comprises sketch-gripping an image boundary
[Col. 11, lines 28-32]

20. Regarding claim 22, the combined invention of Zanelli and McGary discloses all limitations of its parent, claim 21. In addition, Ransford further discloses that the selection is done using manual means [Col. 11, lines 12-21].

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21. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zanelli (US 6,515,657) and McGary (US 5,521,634) as applied to claims 1-3, 10-14, 20, 21, 23-29 and 31 above, and further in view of Flower et al. (US 6,351,663).

22. Regarding claim 15, Zanelli and McGary disclose

- selecting a plurality of frames of interest in a span of interest; applying lossless compression to the plurality of frames of interest and obtaining therefrom a compressed image sequence; applying decompression to the compressed image sequence and obtaining therefrom an analytically relevant image sequence
[Per the analysis of claim 1]

Zanelli and McGary do not expressly disclose that the frames are obtained from an x-ray angiogram and that selecting the plurality of frames of interest comprises selecting

at least two time instances and capturing the frames of interest between the two time instances.

However, Flower discloses capturing x-ray angiograms (i.e., image frames) and comparing a series of angiograms over a time period (i.e., between two time instances) for diagnostic purpose [Col. 1, lines 34-60].

The combined invention of Zanelli and McGary is combinable with Flower since they have aspects that are from the same field of endeavor of image acquisition.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Zanelli and McGary with the teaching of Flower by using x-ray angiograms over a time period (for diagnostic purpose). The motivation would have been because such images are frequently acquired in medical procedures and the reduction of the size (by compression) of the subset of those images (useful for diagnostic purpose) can save the storage cost.

Therefore, it would have been obvious to combine Flower with Zanelli and McGary to obtain the invention as specified in claim 15.

23. Regarding claim 16, it would have been obvious to one of ordinary skill in the art at the time of the invention to select one time instance when a dye appears and a

second time instance when the dye disappears since only images captured during the presence of the dye are useful (as column 1, lines 44-48 of Flower clearly suggests).

***

24. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zanelli (US 6,515,657) and McGary (US 5,521,634) as applied to claims 1-3, 10-14, 20, 21, 23-29 and 31 above, and further in view of Chui et al. (US 5,841,473).

25. Regarding claim 17, the combined invention of Zanelli and McGary discloses

- selecting a plurality of frames of interest; applying lossless compression to the plurality of frames of interest and obtaining therefrom a compressed image sequence; applying decompression to the compressed image sequence and obtaining therefrom an analytically relevant image sequence
[Per the analysis of claim 1]

The combined invention of Zanelli and McGary does not expressly disclose that the frames are obtained from an MRI device.

However, Chui discloses compressing MRI image sequences [Col. 6, lines 36-44].

The combined invention of Zanelli and McGary is combinable with Chui since they have aspects that are from the same field of endeavor of image compression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Zanelli and McGary with the teaching of Chui by compressing MRI image sequences. The motivation would have been because such images are frequently acquired in medical procedures and the reduction of their size (by compression) can save the storage cost.

Therefore, it would have been obvious to combine Chui with Zanelli and McGary to obtain the invention as specified in claim 17.

26. Regarding claim 18, note that manually selecting frames is well known and practiced in the art. [For example, per the analysis of claim 7, Scorse discloses manual selection of the frames of interest.]

***

27. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zanelli (US 6,515,657) and McGary (US 5,521,634) and Chui et al. (US 5,841,473) as applied to claims 17 and 18 above, and further in view of Reinsch (US 5,134,661).

28. Regarding claim 19, the combined invention of Zanelli, McGary and Chui discloses all limitations of its parent, claim 17.

The combined invention of Zanelli, McGary and Chui does not expressly disclose that the frames of interest in a space sequence are automatically selected using edge detection.

However, Reinsch suggests using edge detection to select areas of interest. [Abstract: lines 1-9.]

The combined invention of Zanelli, McGary and Chui is combinable with Reinsch since they have aspects that are from the same field of endeavor of image processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Zanelli, McGary and Chui with the teaching of Reinsch by using edge detection to select areas of interest. The motivation would have been because edge detection produces edge points that can be processed to obtain the contours of regions of interest.

Therefore, it would have been obvious to combine Reinsch with Zanelli, McGary and Chui to obtain the invention as specified in claim 19.

Contact Information

29. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (571) 272-7451. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Yubin Hung
Patent Examiner
May 30, 2006

JINGGE WU
PRIMARY EXAMINER